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Question Paper Code : 91496

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Sixth Semester

Electrical and Electronics Engineering

EE 6602 – EMBEDDED SYSTEMS

(Common to Electronics and Instrumentation Engineering/Instrumentation and Control Engineering)

(Regulations 2013)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions

PART – A   (10×2=20 Marks)

1. What is an in-circuit emulator ?

2. What are the major processor selection criteria for an embedded system ?

3. Compare the key characteristics of RS 232 and RS 485 serial interfaces.

4. What is device driver ?

5. What is co-design and why it is important ?

6. What is data flow graph ?

7. What is pre-emptive and non-preemptive scheduling ?

8. What is RTOS ? Name any two RTOS.

9. Differentiate between hard and soft real-time systems.

10. What is a smart card ?

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PART – B   (5×13=65 Marks)

11. a) Name the structural units in general-purpose processors and explain their functions of each with block diagram. (13)

(OR)

b) What is a DMA ? Draw the block diagram of a typical DMA controller showing the buses and control signals between processor, memory, DMA controller and I/O devices. Also explain how data transferred between memory and I/O devices using DMA controller. (13)

12. a) What is I^2C bus ? Explain the structure of I^2C bus system and working of I^2C protocol. (13)

(OR)

b) What is CAN bus ? Explain the structure of a typical serial CAN bus and CAN protocol frame format. (13)

13. a) Briefly describe embedded system development lifecycle. (13)

(OR)

b) Explain typical co-design process and the issues with hardware and software codesign. (13)

14. a) i) Explain any two mechanisms for inter-task/inter process communication in RTOS µC/OS-II. (8)

ii) Write RT Linux program to display the message "Welcome" once in every seconds. (5)

(OR)

b) Explain briefly the problem of priority inversion and mechanism to prevent the same. (13)

15. a) i) What are the key factors to be considered for selecting an RTOS for an embedded application ? (5)

ii) Describe any four major areas of embedded system applications. (8)

(OR)

b) Describe the hardware components required to design a smart card application and show the interaction among these components. (13)

PART – C   (1×15=15 Marks)

16. a) Describe the working of a typical washing machine which support three functional modes viz. fully automatic mode, semi-automatic mode and manual mode with block diagram. Clearly identify the various hardware and software components and the functions of each component in detail.   (15)

(OR)

b) Design an embedded system for an Adaptive Cruise Control (ACC) system in a car. The system should control at least five functions of the car. Clearly identify functions to be automated and describe the ACC system requirements. Draw the block diagram of the ACC system and identify the hardware requirements. Also draw the class diagram for ACC system.   (15)